

CABLE INDUSTRY TASK FORCE PROPOSAL

For Existing and New Inexpensive TVs & VCRs:

To improve functionality and compatibility, cable will provide on a cost basis, for subscribers who need and request it, supplementary equipment such as:

- 1) External "RF Bypass Switches" for optional purchase or rental. These may also be sold in the retail market place. Within a year after rules are in place, descrambling converters with a built-in "RF Bypass Switch" will be provided to subscribers upon request. Remote controlled descrambling converters will have this function remote controlled as well.
- 2) Within a year descrambling converters with built-in timers (for consecutive recording of different channels) -- or --
"Universal" Remote controls for purchase or rental which include clocks and timers. These may also be sold in the retail market place -- or --
"VCR Plus" units for purchase or rental. These are sold at retail.
- 3) For subscribers with subscriptions to two or more scrambled channels who request it, dual descrambling converters or two descrambling converters will be provided so subscribers can watch one scrambled channel while recording another scrambled channel and/or use certain advanced display features.
- 4) Cable will strengthen consumer education programs in cable/consumer electronics compatibility options and procedures. The NCTA will develop materials.

For New Cable Ready TVs and VCRs:

To improve functionality and compatibility with new consumer electronics products, cable will support the most recent version of ANSI/EIA 563.x^{10/82} agreed to by both EIA and NCTA. This will be done by providing, on request, descrambler units and instructions for subscriber self-installation or installation at no charge. If advanced display features require baseband inputs and the VCR has a Decoder Interface Connector, a decoder module will be provided on a cost basis.

Cable agrees to support the EIA/NCTA Joint Engineering Committee in work towards extending ANSI/EIA 563.x to full digital capability including channel designations for external digital decompressor modules. Cable agrees to a time target of twelve months.

Cable Requires From Consumer Electronics:

- 1) TVs and VCRs which comply with a meaningful technical definition of "Cable Ready" including improved tuners, replaceable tuner modules, and ANSI/EIA 563.x
- 2) TVs and VCRs which are not "Cable Ready" won't tune cable channels.
- 3) Consumer education materials and product labels which accurately indicate options for compatibility.
- 4) Cooperation on backwards compatible extensions of ANSI/EIA 563.x including changes necessary for full digital capability for external decompression modules.
- 5) Consumer products will be clearly labeled as to whether they are "Cable Ready".

**Cable - Consumer Electronics Compatibility
Advisory Group**

Consumer Electronics Proposal

April 5, 1993

- If cable systems deliver all authorized signals simultaneously in the clear, within a defined maximum number of channels to all cable homes, the consumer electronics industry will agree to develop and sell cable ready television receivers and VCRs with improved immunity to direct pick up and improved characteristics for overload and local oscillator leakage and IF image interference.
- The consumer electronics industry agrees that a national standardized security system for analog signals, while desirable may not be practical within the time frame envisioned. However, there is a critical need for compatibility standards for compressed digital television signals, both in the clear and in scrambled formats. To accomplish this, the consumer electronics industry will take part in a voluntary joint committee which will, with all deliberate speed, work to develop the necessary compatibility standards and petition the FCC for their adoption.

APPLICATION OF THE MULTIPOINT CONNECTOR IN THE FUTURE

National Cable Television Association

With modern TV sets, it is not always necessary to use a cable box, except that premium programs are usually scrambled in order to deny access to non paying subscribers. The cable box is still necessary in order to descramble premium signals. Unfortunately, this use of the box gets in the way of a lot of things that the subscriber would like to do. The problems of using a box are well known to many cable subscribers, but the alternatives have a lot of problems. The 1992 cable law will likely make scrambling more important in the future.

The Multiport connector was originally conceived as a more satisfactory way to connect a TV and a cable box, making premium TV viewing easier for the subscriber. At the time, the developers recognized that Multiport could solve problems even beyond descrambling. Additional provisions were made to accommodate these functions, even though they were not well defined at the time. As a tribute to the original developers, as we have prepared this contemporary summary, we have considered applications that had not been proposed in the mid 80s, when the standard was developed. The contemporary applications fit nicely within the standard developed at that time. Were we to start again to define a connector with the same functionality, it is unlikely that we would come out with a substantially different definition than we have now, though a few extensions would be made.

In this document, we show some of the applications for multiport, illustrating the various ways to use the pins we have. All of the present pins are useful, though we have one pin, for SAP, that could probably be defined slightly differently now. In the appendix we shall discuss the impact on eliminating various functions.

Figure 1 shows three uses for the Multiport connector. The top application was the prototype application for which Multiport was developed. This application replaces the cable box with a simpler "set back" box, which literally can be placed in back of the TV set, out of the consumer's way. On channels which don't need to be descrambled, the box does nothing. On channels which are scrambled, but for which the consumer has not paid, the box can eliminate any picture or sound on the screen. This is a real service to the subscriber who might be offended by material on some channels. On scrambled channels to which the consumer has subscribed, the box begins descrambling, with the consumer not knowing that it happened.

Pay-per-view events can be ordered if the box is suitably equipped, using the TV remote control to order.

The consumer gets back all of the features of his TV set, including unobtrusive use of his remote control, picture in picture, etc. With suitable connection, he can watch one thing

and record another without having to worry about what is and is not scrambled,¹ and without having complex RF switching schemes, which are confusing and which often cause problems of their own.

A second application for Multiport is shown in the center of figure 1. Super VHS (S-VHS) tape recorders are available today, which offer better picture quality than do conventional VCRs. They must be connected to the TV differently than are conventional VCRs, in order to take advantage of much of the improvement. The S-VHS standard was introduced late in the development of the Multiport, but the standard can accommodate S-VHS.

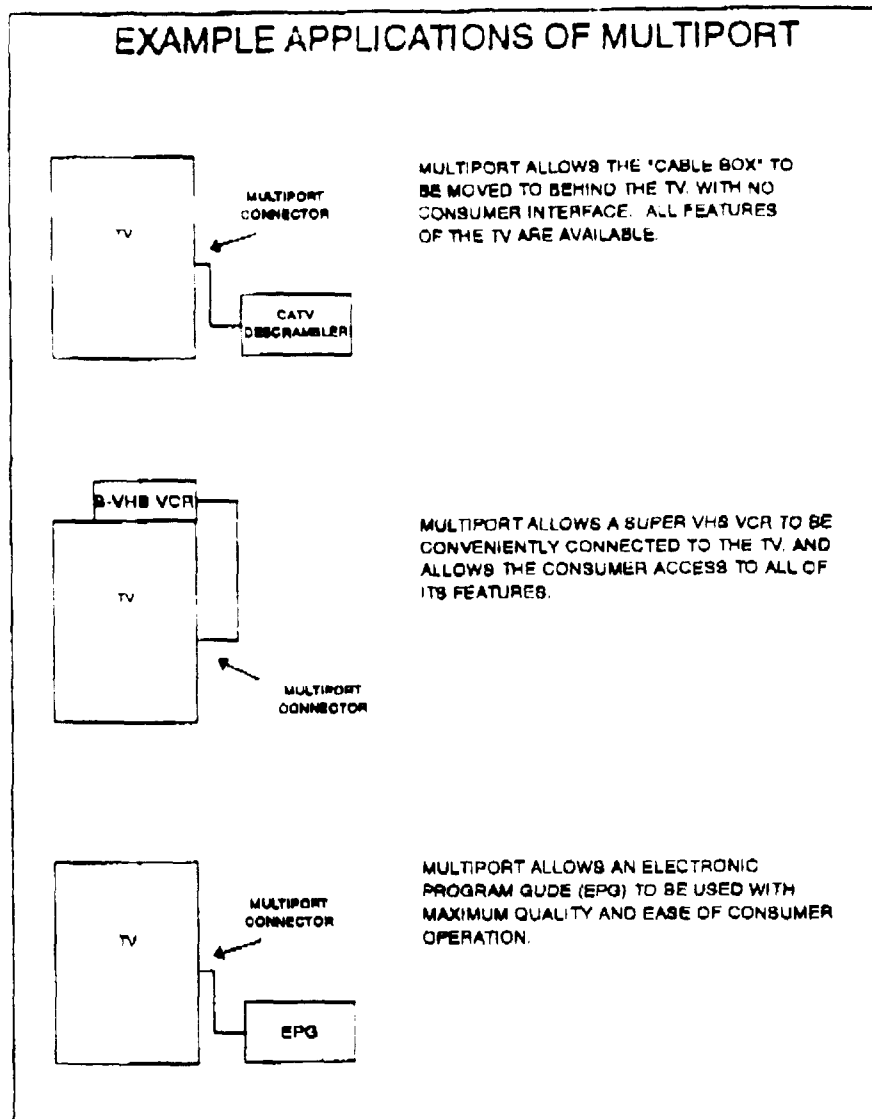


Figure 1

A third application of Multiport was not even conceived until after the standard was adopted. This is shown in the bottom of figure 1. Electronic Program Guides (EPGs) are being developed now to ease the confusion of subscribers, as the choice of programs has increased. In today's world, the subscriber may have up to nearly 80 program choices. In this environment, selecting the program by consulting a printed program guide, finding the channel number

¹A second box will be needed if both the channel being viewed and the channel being recorded are scrambled. This will not pose the same problems it does today: when the Multiport box reaches current set top volume production, it will be less expensive, making it easier for the consumer to have two boxes. Since the box doesn't include a remote control, the confusion of multiple remotes is reduced.

To ease this, EPGs are being proposed. A subscriber will use an EPG by activating it with his remote control. When he does, a program guide will appear on his screen. Using his remote control, the subscriber peruses the EPG, looking for something he likes. As he moves from one program to another, the one he is considering is highlighted. When the subscriber selects the program, the TV automatically tunes to it. Because it is necessary to put many small characters, and possibly graphics, on the screen, it is not possible to do this by making up a composite NTSC TV signal of the kind we normally deal with, and expect the lettering to look good. The lettering will look much better if we can get into the TV with what are called "color difference signals," as well as with the black and white (luma) information. This is possible with the Multiport standard.

1. CATV DESCRAMBLER WITH AUDIO SCRAMBLING



Figure 2 shows the application of Multiport to the cable box. The highlighted connections are used. We assume that the signal being received is scrambled, with stereo audio hidden in the audio portion of the signal. The subscriber controls tuning with his remote control, including possible access to impulse pay-per-view programs, which he can order from his remote control. The TV recovers the scrambled video and audio, and sends them to the CATV descrambler shown at the top of figure 1. Each of the pins in the connector is used as shown, to effect this process. Scrambled video is sent to the descrambling box on pin 19, and scrambled audio is sent on pin 8. The descrambling box returns descrambled video on pin 20, and descrambled stereo audio on pins 2 and 6. The box sets the TV to switch to the correct sources, using pins 1 and 9. The TV tells the box what to do, using pins 10 and 14. The other pins are needed for technical reasons, to make the system work.

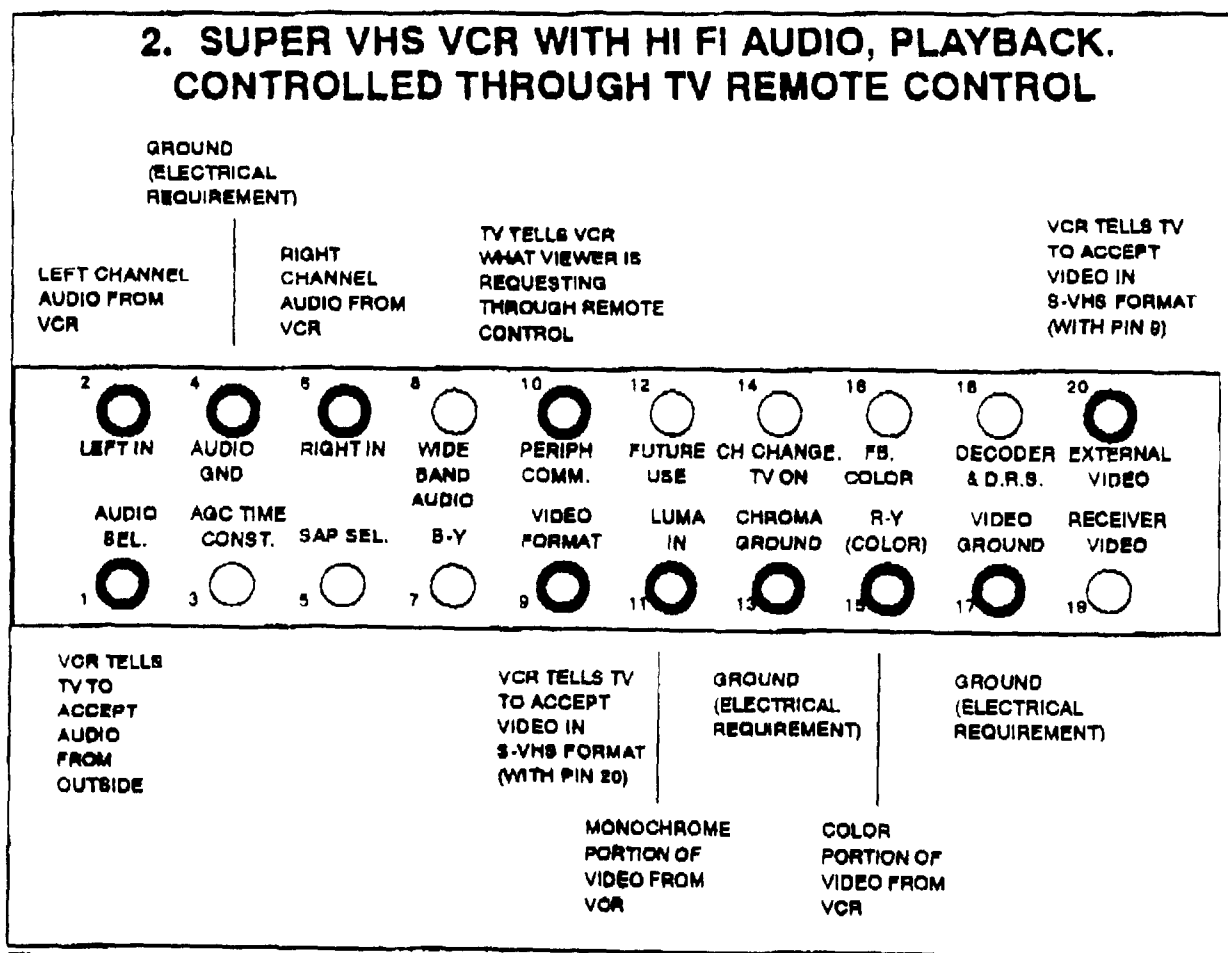


Figure 3

Figure 3 shows the pins used in the S-VHS example. Here we assume that the consumer controls the VCR through his TV remote control, through pin 10. The VCR

supplies video on pins 11 and 15.² Audio is supplied on pins 2 and 4. Pins 1, 9 and 20 tell the TV where to find the video and what type of video it is. The other active pins are grounds, needed for optimum quality signals.

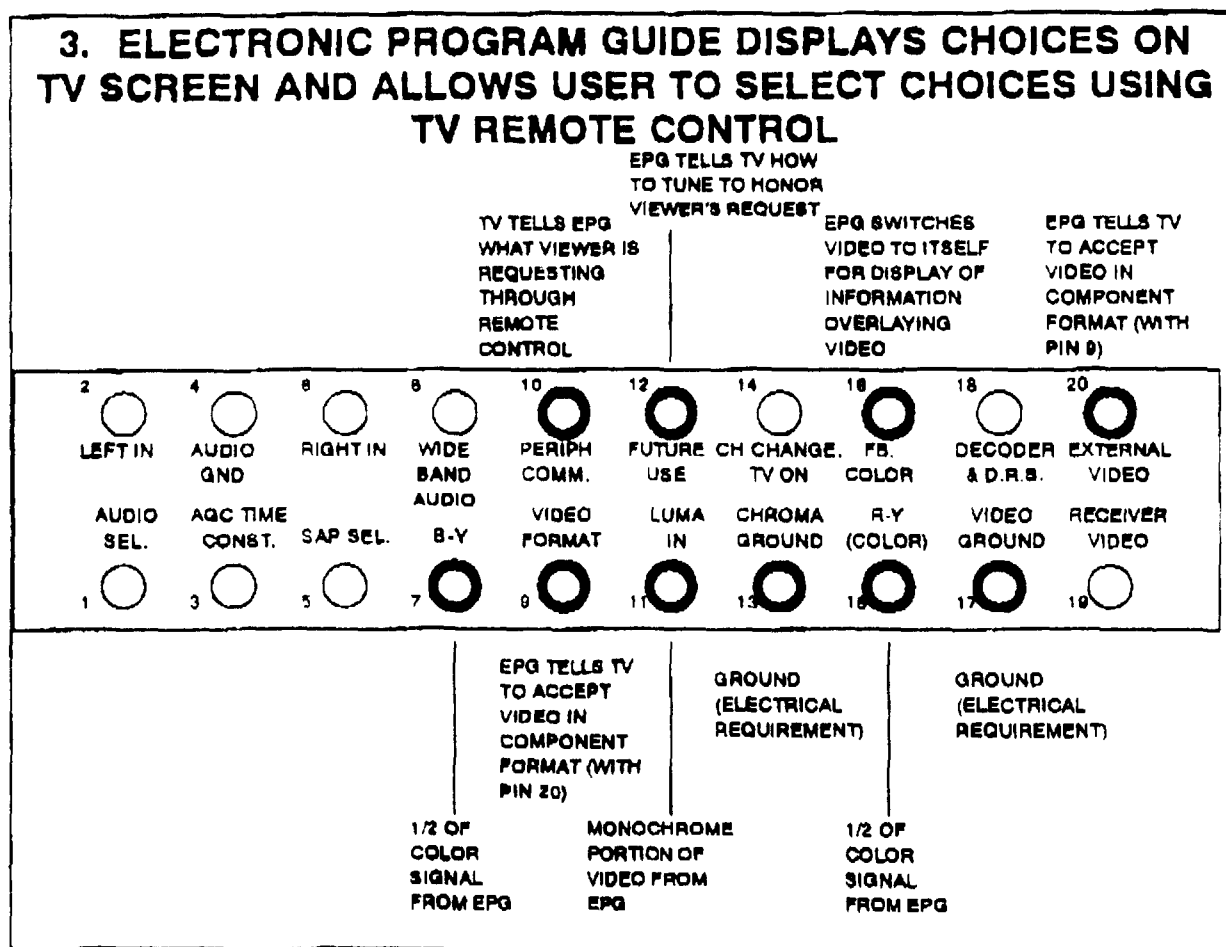


Figure 4

Figure 4 shows the use of Multiport with an electronic program guide (EPG). The EPG box sends its portion of the picture (the text and icon overlay) to the TV on pins 7, 11 and 15.³ It must change the TV from displaying normal picture to displaying the EPG information very quickly, and this control is accomplished on pin 16. The EPG must be

²In order to send the best quality picture possible, the black and white, and color portions of the picture must be sent to the TV separately. This is one of the basic improvements embedded in the S-VHS standard.

³In order to get the quality signal needed here, it is best to send it in three parts: the black and white portion, and two color signals.

controlled through the TV remote control, and this data is passed on pin 10. The future use pin, 12, will probably be required to allow the EPG circuitry to control the TV's tuning, allowing the consumer to highlight the program, and have it automatically tuned without the consumer knowing the channel number. The other active pins are used for technical reasons.

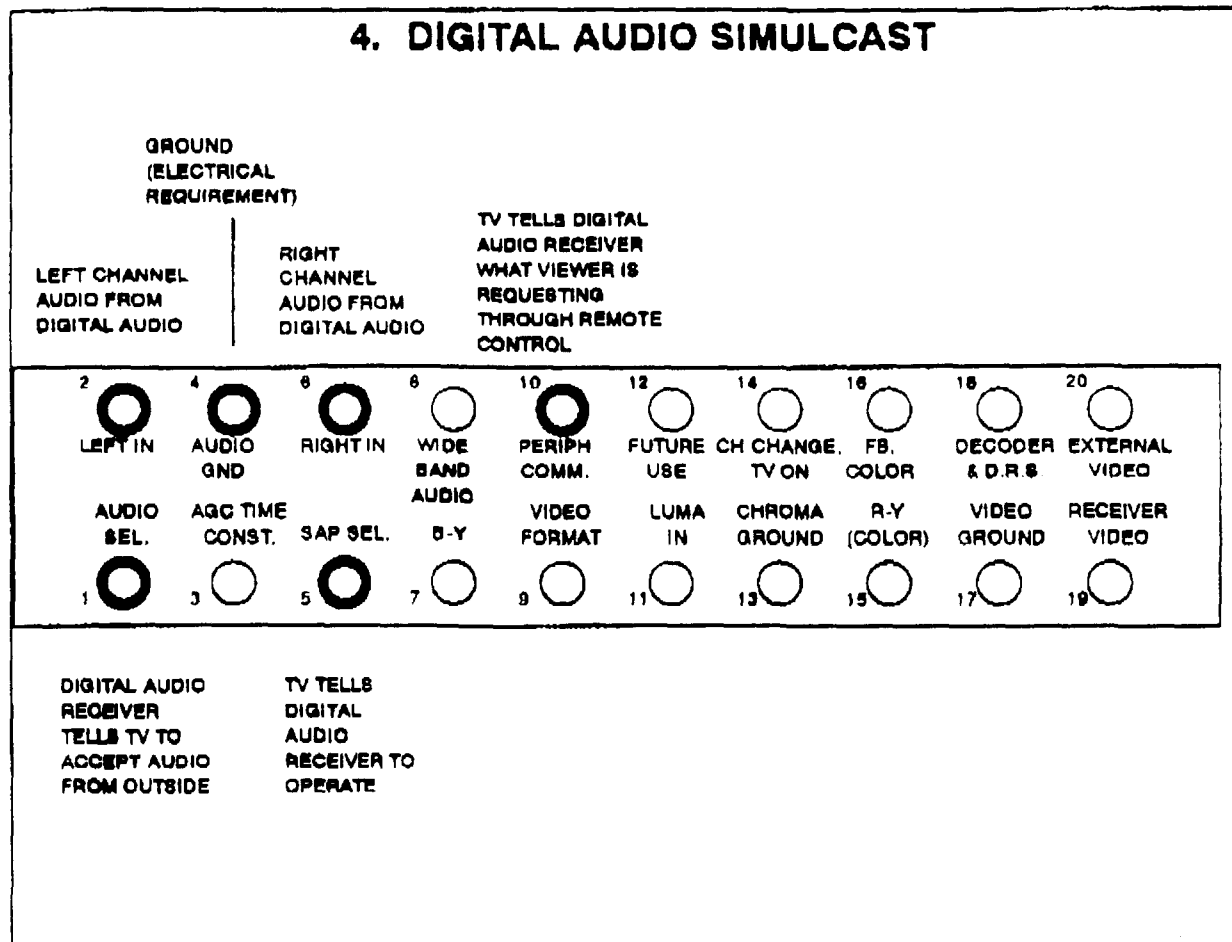


Figure 5

Yet another application is shown in figure 5. Here we are using a digital audio simulcast, in which a viewer is watching, for example, a concert in which audio quality is important. The audio is being sent on a digital audio channel in addition to being sent with the TV signal. In order to view the picture and simultaneously hear the high quality digital audio, the viewer has attached a digital audio receiver to his Multiport plug on the TV set. Pin 5 is used to allow the TV to instruct the digital audio receiver to work.⁴ Pin 10 tells the

⁴While not a true application for SAP, the pin can be used for other things such as this, which were not envisioned at the time the Multiport standard was adopted.

APPLICATION OF MULTIPOINT TO DIGITAL TRANSMISSION

An intermediate step is to use Multiport-equipped TVs with a decompression box. The TV will need one more output but this can be placed beside the Multiport connector, and

APPENDIX. CATALOG OF PIN FUNCTIONS FOR EIA-563 CONNECTOR

The designations used for the pins are oriented to the needs of the TV set.

PIN 1. *Audio Select.* Allows an external box to decide whether or not the TV or VCR should use audio derived from its own detector, or to accept audio from the external source. The TV will need to accept audio from the external source to accommodate scrambled audio or user-friendly simulcast.

Loss of this pin would render several of the above illustrated applications of the connector, to be impossible.

PIN 2. *Audio In, Left.* Accepts external audio for the left channel. The impact of loss of this pin should be obvious.

PIN 3. *AGC Time Constant/Video Select.* Works with pin 18 to provide several functions: one of the functions is to select either the TV's internal video, or video from an external source. This is needed in order to allow seamless transition from normal unscrambled video, to a scrambled program.

The other functions are covered in more detail under the description of pin 18. They involve setting the TV up for proper acquisition of a scrambled signal.

This pin was included because it was deemed necessary to adjust the AGC time constant for certain scrambling systems, which didn't maintain the normal relationship between sync in the vertical and horizontal blanking intervals. Loss of this pin would render the standard unusable with those scrambling systems. These scrambling systems remain in use today.

PIN 4. *Audio Ground.* Needed for technical reasons. Audio signal are extremely

PIN 6. Audio Input, Right. Accepts external audio for the right channel. The need for this pin is obvious.

PIN 7. B-Y Channel. Input for component video, one component of chroma. the other component, if used, is on pin 15. It is needed for improved signals which don't have NTSC artifacts.

Loss of this pin would preclude interfacing using color difference signals, a loss where small graphics and lettering is needed.

PIN 8. Wideband Audio Out. This pin was originally conceived as a way of adding an external stereo decoder. As the market has developed, this is not a likely application. However, many systems for analog audio scrambling utilize the audio frequencies carried on this connector, so the need remains.

Loss of this pin could compromise future scrambling systems, and would preclude use of at least one audio masking technique currently available in the market.

PIN 9. Video Format. In order to maximize the industry's ability to improve service, we must allow any of several types of video formats to be supplied, and this pin is part of the process of telling the TV which format is being supplied. Pin 20 works with this pin to complete the definition.

Loss of this pin would make it more difficult to control the TV in some of the modes needed, and would render the Multiport standard less robust.

PIN 10. Communication to Peripheral. Allows the TV/VCR to send messages to the add-on box. For example, the TV may need to tell the box what channel it is tuning, or that the subscriber has requested a pay-per-view program. In addition, some scenarios have this pin allowing the TV to communicate with other equipment supporting the EIA CeBus protocol.

This pin is essential to future applications of the product, in which one device will control another.

PIN 11. Luminance Input. Works with pins 7 and 15 when component video is used to provide higher quality signals than NTSC can provide.

Loss of this pin would cause difficulty in transferring high quality signals to the TV.

equipment.

PIN 13. *Fast Blanking/Chroma Ground.* This is a ground pin used to provide for better video signal to noise ratio by allowing the chroma (color) signal to be grounded separately.

As with other ground pins on the connector, this one is needed in order to ensure that high quality signals can be delivered, considering all of the circuits operating in close proximity around the TV.

PIN 14. *Channel Change/Power.* This pin tells the external box that the TV is in the process of changing channels, or that the TV is off. The box may need to know of a channel change in order to initiate a signal acquisition process, which is only needed one time each time a signal is tuned. The external box may need to know when the TV is on, for example, if it is tracking TV viewing for a rating firm, or if it is to record billing information for a pay-per-view event. We don't want to record a program not actually being watched, and we certainly don't want to bill for a pay per video program that wasn't watched.

The channel change feature was included because some scrambling system proponents felt that it would speed acquisition of a scrambled signal. The power function was included to ensure knowledge of the state of the TV.

PIN 15. *R-Y Channel.* Input for component video, one component of chroma. the other component, if used, is on pin 7. It would be needed for improved signals which don't have NTSC artifacts.

Loss of this pin would preclude interfacing using color difference signals, a loss where small graphics and lettering is needed.

PIN 16. *Fast Blank/Chroma.* This is needed if an external box needs to superimpose characters over a video signal that is being handled by the TV. For example, suppose an electronic program guide needed to overlay a description of a program, on that or another program. The fast blanking pin would be used to cause the TV to switch at the appropriate time, from the internal video to the overlay. This switching must be done in a few billionths of a second if it is to look good on the screen. Control of switching through other inputs will not allow this fast of a switching operation.

Besides controlling the switching to the external video for the overlay, this pin contains the color information for the overlay. This is one of several examples of pins that are used for more than one function. Using pins for multiple functions allows more versatility in the interface while keeping costs down by using fewer total pins.

This pin is needed to facilitate the use of highest quality on screen displays.

PIN 17. *Video, R-Y, B-Y Ground.* Improves the quality of pictures by isolating the noise from different parts of the system.

As with other ground pins on the connector, this one is needed in order to ensure that high quality signals can be delivered, considering all of the circuits operating in close proximity around the TV.

PIN 18. *Decoder Present, Decoder Restored Sync.* This is another pin with multiple functions. One function is to tell the TV that an external box is present, so the TV should communicate with it. The other function is to allow the receiver AGC to work properly when handling a scrambled signal. Common scrambling systems modify the video signal in ways such that the automatic gain control (AGC) circuits in the TV won't work properly. This pin is used to allow the external box to supply a signal for controlling gain in the TV. Without this, it is conceivable that the TV won't produce a reasonable signal for the external box to use, because the AGC circuit would be confused and would set the TV operating parameters to an inappropriate point for the signal being used.

This pin is absolutely essential if the automatic gain control in the TV set is to work on scrambled signals.

PIN 19. *Receiver Video Output.* This is the pin used to supply video to the external box. The video is supplied scrambled, for example, and is returned to the TV descrambled, on pin 20.

This pin is fundamental to the concept of the Multiport standard.

PIN 20. *Receiver Video Input.* This is the video coming in to the TV from the external box.

This pin is also fundamental to the Multiport concept.